

What is claimed is:

1. Apparatus comprising:

an audio source generating an audio signal;

5 a pre-amplifier coupled to said audio source and having a controllable gain for pre-amplifying said audio signal;

a power amplifier coupled to said pre-amplifier and having a substantially fixed gain for amplifying
10 said pre-amplified audio signal;

a threshold adjuster for generating a distortion threshold representative of an amount of distortion to be allowed to be introduced by said power amplifier in response to a frequency content of said audio signal;

15 a distortion detector coupled to said power amplifier and generating a distortion signal in response to said distortion threshold and said audio signal;

a gain limiter for reducing said controllable gain if said distortion signal exceeds said distortion
20 threshold.

2. The apparatus of claim 1 further comprising:

a frequency analyzer coupled to said audio source and generating a frequency detection signal for
25 characterizing said frequency content of said audio signal, said frequency detection signal being coupled to said threshold adjuster.

3. The apparatus of claim 2 wherein said

30 frequency detection signal is proportional to an upper

frequency below which a predetermined portion of said audio signal is contained.

4. The apparatus of claim 3 wherein said
5 distortion threshold increases in response to an increase of said frequency detection signal.

5. The apparatus of claim 3 wherein said
distortion threshold increases logarithmically in
10 response to an increase of said frequency detection signal.

6. The apparatus of claim 3 wherein said
distortion threshold increases stepwise in response to
15 an increase of said frequency detection signal.

7. The apparatus of claim 3 wherein said
distortion threshold varies in a range between about 2%
and about 10% in response to said frequency detection
20 signal.

8. The apparatus of claim 1 wherein said
threshold adjuster determines said frequency content in
response to an identity of said audio source.
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9. The apparatus of claim 8 wherein said
apparatus is an automotive audio system having a
plurality of audio sources including an AM radio tuner
and wherein said threshold adjuster generates a
30 distortion threshold corresponding to a low distortion

level when said AM radio tuner is providing said audio signals and generates a distortion threshold corresponding to a higher distortion level when said AM radio tuner is not providing said audio signals.

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10. A method of limiting distortion in an audio system comprising the steps of:

generating an audio signal from an audio source;

pre-amplifying said audio signal in response to a
10 controllable gain;

power amplifying said pre-amplified audio signal
in response to a fixed gain;

characterizing a frequency content of said audio
signal;

15 generating a distortion threshold in response to
said characterized frequency content, said distortion
threshold representative of an amount of distortion to
be allowed to be created by said power amplification;

detecting a distortion level being introduced by
20 said power amplification; and

reducing said controllable gain if said detected
distortion level exceeds said distortion threshold.

11. The method of claim 10 wherein said
25 characterizing step is comprised of determining a
frequency content inherent in said audio source.

12. The method of claim 11 wherein said audio
source is selected from multiple sources including an AM
30 radio tuner, and wherein a relatively lower distortion

threshold is generated in response to said AM radio tuner being selected.

13. The method of claim 10 wherein said
5 characterizing step is comprised of measuring said frequency content using a frequency analyzer.

14. The method of claim 13 wherein said
frequency analyzer generates a frequency detection
10 signal proportional to an upper frequency below which a predetermined portion of said audio signal is contained.

15. The method of claim 14 wherein said
distortion threshold increases in response to an
15 increase of said frequency detection signal.

16. The method of claim 14 wherein said
distortion threshold increases logarithmically in
response to an increase of said frequency detection
20 signal.

17. The method of claim 14 wherein said
distortion threshold increases stepwise in response to
an increase of said frequency detection signal.

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18. The method of claim 14 wherein said
distortion threshold varies in a range between about 2%
and about 10% in response to said frequency detection
signal.